currence there or elsewhere in its neighborhood of completely isolated plants not generally found east of the Continental Divide, such as *Ceanothus sanguineus* Pursh, *Vaccinium membranaceum* Dougl., *Adenocaulon bicolor* Hook. and many others discussed by me in RHODORA, xxxvii., nos. 438–441, their segregation shown in maps 6, 7, and 9 (1935).

Characteristic illustrations of the fertile stems of the two varieties of *Equisetum Telmateia* are the following. Of true European E. TELMATEIA: Milde, Mon. Equiset. t. v, fig. 28 (1865); Pratt, Grasses, Sedges & Ferns Gr. Brit. ed. 3. vi. t. 313 (1873); Syme, Engl. Bot. xii. t. 1888 (1886); Bergdolt in Hegi, Ill. Fl. Mittel-Eur. i. t. 9, fig. 2 (1908). Of the North American var. BRAUNII: Clute, Fern Allies, 59 (1905); Abrams, Ill. Fl. Pacific States, i. 32, fig. 2 (1921).

THE USE OF ALCOHOL IN PLANT COLLECTING

W. H. HODGE

Recently R. E. Schultes (RHODORA **49:** 54–60. 1947) has given us a valuable account of Paul Allen's method of preparing herbarium specimens with the aid of formaldehyde. Schultes points out that the method is useful in the wet tropics, expecially where rather limited collections are to be made and where transportation and drying problems are difficult. I should like to append to his article a brief description of another agent, alcohol, which is used in a fashion similar to formaldehyde, to which under certain conditions it may prove superior. Since Schultes has summarized the difficulties of a botanical collector in the wet tropics and the concomitant reasons for treating with formaldehyde, I will not repeat the same problems but suggest that the reader review the present article in conjunction with that of Schultes.

I owe the method here described to Augusto Weberbauer of Lima, an eminent student of the Peruvian flora. In a lifetime of extensive field collecting in some of the most difficult terrain in this hemisphere, Professor Weberbauer has found alcohol to be most useful in the preservation of all kinds of herbarium material. I can recommend it as well, for during two and a half years of wartime field work as a cinchona botanist in Peru, I used Weber-

bauer's method almost entirely. The great distances to be covered in that country, the lack of time for drying in the field, the limited number of mules or Indian carriers which placed a definite limit on the amount of field equipment carried, the war emergency that required a single botanist to do many tasks unrelated to his science—all these were ample arguments against dallying in the field with ordinary and bulky drying equipment. And because our field work was largely limited to a special group, the genus *Cinchona* and its close relatives, our plant collections were small.

As with formaldehyde, the principal value of alcohol is not in eliminating standard drying procedure but rather in preserving plants in good condition and for indefinite periods until they may be pressed and dried carefully in a location where drying facilities are available and subsequent safe storage may be effected. The advantages of alcohol over formaldehyde are principally three: 1) alcohol, in one form or another (rum, aguardiente, etc.) is nearly always available in out-of-the-way places; in general wherever you find man you find some kind of usable alcohol; for this reason there is seldom any need of carrying alcohol on a trip, at least not for any great distance; 2) alcohol—any crude local form will do—is relatively inexpensive, unlike formaldehyde which is a costly reagent throughout Latin America; 3) alcohol is not an irritant and does not have to have special handling. There are enough inconveniences in the field without having to worry about skin-cracking and possible infections resulting from such injuries.

Specimens treated with either formaldehyde or alcohol must be shipped in some kind of air-tight container which will not permit evaporation. Besides the alcohol and the usual supply of pressing paper, one needs a box of some kind. Schultes mentions the possibility of wrapping formaldehyde-dipped specimens in pliofilm. Presumably such a covering would work also with plants preserved with alcohol but care should be taken that such material be so wrapped that the pliofilm covering is well protected; a hole made in this wrapping during shipment and permitting evaporation of the alcohol would result in worthless specimens. In Peru I originally used light but strong plywood boxes into which fitted a removable metal box, made to the

internal dimensions of the former. The metal box with its removable cover could be sealed tightly by means of strips of one-inch-wide surgeon's tape which could be waxed over lightly, after sealing, by rubbing with an ordinary candle. The outer wooden box was merely a protective shell against the hard knocks of transit. The dimensions of a box of this type need not be standardized but in width and depth should be just equal to a standard folded newspaper (or a 12 x 18 inch collecting sheet). The length of the box may vary but is usually limited to the size demanded (24–30 inches) by the type of transportation agent—in Andean Peru a mule or an Indian's back. It must be remembered in mule transport that boxes should be in equal-sized and equal-weighted pairs to counteract the danger of shifting cargo on treacherous trails. Boxes of the type described were fitted with padlocks because they served our parties in a double capacity. Since they were more or less watertight and vermin-proof, they could be utilized to carry food and provisions until empty, whereupon they became available for the storage of specimens. Later in our work we had a local metal shop make up sturdier galvanized boxes of the same dimensions but without wooden covers. These functioned well although without the protection of the wooden cover it was more difficult to protect the taping against pulling or rubbing off in transit. In some parts of the Andes I have seen crude, heavy, and rainproof leather boxes used for cargo and these would make excellent protective covers for metal boxes.

Freshly collected specimens are placed in regulation-size folded newspaper stock on which is added the collection number and any other necessary data. I have found that the subsequent use of alcohol does not eliminate pencilled notations, but I have always preferred and have used heavy wax or other types of colored marking pencils. Once annotated or numbered, the specimens may be placed directly in the collecting box—no pressing of any kind is necessary. Alcohol is added at this time, and usually, as I have stated above, in the form of some kind of locally available native drink (a shocking thing to the Indian aides who can never understand such wasteful procedure!). The liquid is poured over the papers but only in a quantity sufficient thoroughly to moisten them. A little excess liquid in the

bottom of the tin box will do no harm. The metal cover of course should be immediately put in place after the alcohol is added in order to prevent loss from evaporation. Just as in a press, a collecting box of this type will hold as many specimens in their papers as can be squeezed tightly into it. When full the cover is sealed with the tape and then waxed, but before this is done one should be certain that all papers are reasonably moist with alcohol. Experience has shown that plants, if untampered with, are good for several months of perfect preservation in such a box once it has been sealed.

Boxes containing specimens temporarily preserved in this manner in a saturated atmosphere of alcohol, are light in weight and lend themselves to all methods of transport including shipment by air. Thus upon our arrival in a populated district after a long trip, it was our custom to air-express the containers to the museum of the University of San Marcos in Lima where aides would open the boxes, remove the plants, and prepare them for the herbarium, handling them during the drying process exactly as though they were fresh material. The empty boxes could be returned by air to the field party. Herbarium specimens made in this way appear to be just as satisfactory as specimens prepared by normal procedures, and in fact they are less brittle than those obtained from fresh material and dried immediately by artificial heat. Of course, and as with formaldehyde, all natural colors are lost, the specimens appearing brownish. For this reason it is imperative that the botanist record all such data at the time of collection in the field.

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TWO EASTERN AMERICAN SPECIES OF IRIS

M. L. Fernald

Iris Hookeri Penny, forma **pallidiflora** (Fern.), comb. nov. *I. setosa* Pallas, var. *canadensis* M. Foster, f. *pallidiflora* Fern. in Rhodora, xxviii. 168 (1926).

I. Hookeri, forma **zonalis** (Eames), comb. nov. *I. setosa*, var. *canadensis*, f. *zonalis* Eames in Rhodora, xi. 91 (1909).

The blue-flowered *Iris Hookeri*, so distinct in its dense habit, with strongly multicipital base with erect crowns, low stature,